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(54) Title: METHOD FOR THE SYNTHESIS OF ENERGETIC THERMOPLASTIC ELASTOMERS IN NON–HALOGENATED SOLVENTS

(57) Abstract

A method of preparing a thermoplastic elastomer having A blocks which are crystalline at temperatures below about 75 °C and B blocks which are amorphous at temperatures above about –20 °C is disclosed. The A blocks are derived from oxetane derivatives and/or tetrahydrofuran derivatives. The B blocks are derived from oxetanes, tetrahydrofuran, oxiranes, and derivatives thereof. The A blocks and B blocks are dissolved into solution containing a non–halogenated solvent, preferably tetrahydrofuran. The dissolved A blocks and B blocks are dried of water by azeotropic distillation of the non–halogenated solvent. Next, the dried A blocks and the dried B–blocks are end–capped with a diisocyanate having one isocyanate moiety substantially more reactive with the terminal groups of the blocks than the other isocyanate moiety, whereby the more reactive isocyanate moiety is capable of reacting with the terminal groups of the blocks, leaving the less reactive isocyanate moiety free and unreacted. The end–capped A blocks and the end–capped B blocks are linked together with a linking compound having two isocyanate–reactive groups which are sufficiently unhindered to react with the free and unreacted isocyanate moieties of the end–capped polymers.